ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY

IN THE MATTER OF:

CEDAR CHEMICAL CORPORATION, NO. LIS 91- 118
WEST HELENA, ARKANSAS

(ARD990660649)

CONSENT ADMINISTRATIVE ORDER

JURISDICTION

1. This Consent Administrative Order is entered pursuant to the authority of the Arkansas Remedial Action Trust Fund Act ("ARATFA"), ACA §8-7-508, as currently amended; the Arkansas Hazardous Waste Management Act ("AHWMA"), ACA §8-7-214; and the Arkansas Hazardous Waste Management Code (the "Code"). All terms contained within this document shall have the definitions as found in the above-referenced laws, unless the context plainly indicates otherwise.

2. The issues herein have been settled by the agreement of Cedar Chemical Corporation (the "Respondent") and the Director of the Arkansas Department of Pollution Control & Ecology ("ADPC&E") without prejudice to the right of Respondent to contest the findings of fact or conclusions of law or determinations made herein, subject to the Respondent's agreement not to contest ADPC&E's subject matter jurisdiction with respect to the Consent Administrative Order, and without prejudice to Respondent's right to seek contribution from other liable parties pursuant to ARATFA §8-7-520.

STATEMENT OF PURPOSE

3. By entering into this Consent Administrative Order, the mutual objectives of ADPC&E and the Respondent are:

a. To remove buried drums discovered by the Respondent on its chemical manufacturing plant located on a 48-acre site on Highway 242 in West Helena, Arkansas (hereinafter the "Site") and to carry out a closure of said burial area in accordance with a Removal Work Plan dated June 1990, heretofore submitted by Respondent to and approved by, ADPC&E; and

b. To prepare and submit to ADPC&E a preliminary report describing the current conditions at the Site; also, to develop and implement a facility investigation work plan including reports of investigation analysis, laboratory and bench scale studies and periodic progress reports, and a corrective measures study, all in accordance with the Scope of Work Documents (the "Scope of Work") attached hereto as Exhibit A. The ultimate purpose of the tasks described in the Scope of Work is to determine the nature and extent of contamination on the Site and to determine the potential for the release or threat of release of any hazardous substances from the Site so that if deemed necessary by ADPC&E, appropriate remedial alternatives can be developed.

PARTIES

4. This Consent Administrative Order shall be binding upon ADPC&E and upon the Respondent named herein and any subsequent respondent who shall become signatory hereto, their successors and assigns, and shall control the work of all persons, agents, contractors and technical consultants acting under or for ADPC&E or the Respondent in carrying out the actions required by this Consent Administrative Order.

5. Respondent shall provide a copy of this Consent Administrative Order to each contractor, subcontractor, laboratory and technical consultant retained by it to conduct any portion of the work performed pursuant to this Consent Administrative Order prior to said contractor's, subcontractor's, laboratory's or consultant's initiation of work conducted under this Consent Administrative Order.

6. Any contract entered into by the Respondent for the purpose of carrying out any actions required by this Consent Administrative Order shall incorporate the requirements of this Consent Administrative Order pertaining to the work to be performed or services or materials to be supplied.

FINDINGS OF FACT

7. Based on available information regarding the Site, including the investigations and reports heretofore carried out and submitted by Respondent to ADPC&E pursuant to the requirements of a Consent Administrative Order heretofore entered into between the Respondent and ADPC&E in LIS 86-027 (the "Previous CAO") (ADCP&E having specifically found that the Respondent has fully complied with the provisions of the Previous CAO), ADPC&E makes the following findings of fact:

a. The Respondent is a Delaware corporation duly qualified to do business in the State of Arkansas. The Respondent assumed management responsibility for and control of the Site on December 16, 1985, and acquired ownership of the Site thereafter on February 28, 1986.

b. From the early 1970's until Respondent acquired control and ownership of the Site in 1986, the Site was owned and/or operated by a succession of other companies.

c. The Site consists of 48 acres located in the Helena-West Helena Industrial Park located on Highway 242 south of West Helena, Arkansas. Active operations are carried out on about twenty acres on the Site.

d. The first manufacturing unit on the Site was constructed by a former owner in 1970-1971 for the production of propanil, a rice herbicide. Subsequent manufacturing units were constructed and operated by former owners for the production of dinoseb, and other agricultural and industrial chemicals.

e. Currently, Respondent uses the Site to manufacture propanil and dichloroaniline which it markets under its own labels, and for the manufacture of various other agricultural and industrial products which Respondent produces under custom manufacturing contracts with its customers. A new office administrative building was recently constructed on the Site. Respondent currently employs approximately 125 persons at the Site.

f. Data and reports submitted by Respondent pursuant to the groundwater monitoring plan implemented in accordance with the Previous CAO have raised areas of concern which ADPC&E deems to merit additional investigation to determine the source and extent of contamination of ground water on the Site for the purpose of developing any appropriate remedial alternatives deemed necessary.

g. In addition, in the course of constructing a stormwater drainage line in the spring of 1990, employees of Respondent discovered a drum burial area on the Site is believed to have been installed by a former operator of the site. The extent of the burial area was delineated and characterized in accordance with a site characterization report heretofore submitted by Respondent to ADPC&E. Thereafter, a Removal Plan dated June 1990 (the "Removal Plan") was submitted by the Respondent to, and approved by, ADPC&E.

CONCLUSIONS OF LAW

8. Based upon the foregoing findings of fact, the Director, ADPC&E makes the following conclusions of law which are neither an admission by, binding upon or conclusive as to the Respondent except as provided herein:

a. Respondent is a "person liable for the site" as that term is used in ACA §8-7-508.

b. The Site as described herein is a "hazardous substance site" as that term is used in ACA §8-7-503.

DETERMINATIONS

9. Based upon the foregoing findings of fact and conclusions of law, the Director, ADPC&E, has determined that:

a. There is a threat of release of a hazardous substance at and or from the Site.

b. It is necessary that the drums located in the drum burial area identified in the Removal Plan referred to in Paragraph 7.g. be removed from the Site and properly disposed of in a manner consistent with the Removal Plan referred to hereinabove, and that Respondent expand the investigation of the nature and extent of contamination of soils and groundwater at the Site which it initiated in accordance with the Previous CAO.

c. The actions agreed upon under the terms of this Consent Administrative Order are in the public interest, are consistent with the National Oil & Hazardous Substances Contingency Plan, 40 C.F.R. §Part 300, and are necessary to protect the public, health, welfare and the environment.

ORDER

10. IT IS THEREFORE AGREED AND ORDERED by consent of Respondent and ADPC&E, as follows:

Interim Measures

a. As an interim measure to achieve the purposes of this Consent Administrative Order, the Respondent shall, not later than sixty (60) days following the effective date of this Consent Administrative Order, retain a qualified contractor or contractors to implement the Removal Plan referred to in Paragraph 7.G. hereof for the purpose of removing and properly

disposing of the buried drums previously discovered on the Site, as aforesaid, and closing the said burial area in accordance with the aforesaid Removal Plan. Respondent shall cause the Removal Plan to be implemented beginning not later than ninety (90) days following the effective date hereof. The Respondent shall cause ADPC&E to be notified at least five (5) days prior to initiation of the drum removal activities hereunder.

b. Within sixty (60) days after completion of the Removal Plan, the Respondent shall submit to ADPC&E a detailed written report describing the activities undertaken to complete the Removal Plan, including all necessary and appropriate certifications and supporting information which is reasonably necessary for ADPC&E to evaluate and approve such report.

c. If at anytime during the Removal Plan implementation or the facility investigation, a substantial threat to the human health or the environment is discovered, additional interim measures by the Respondent may be necessary. Such interim measures will be taken at the direction of ADPC&E for the purpose of alleviating imminent threats to human health or the environment, subject to the dispute resolution provisions hereof.

Facility Investigation

d. Within ninety (90) days following the effective date of this Consent Administrative Order, the Respondent shall submit to ADPC&E a comprehensive facility investigation work plan (the "FIWP"). The facility investigation shall be designed to determine the nature and extent of releases of hazardous substantices from regulated units, solid waste management units, and other source areas at the facility, in accordance with the Scope of Work. In addition, the facility investigation shall collect all of the necessary data to develop a corrective measure study in accordance with the Scope of Work.

The facility investigation shall consist of the following tasks:

(1) Description of Current Conditions

(a) Facility Background
(b) Nature and Extent of Contamination

(2) FI Workplan Requirements

(a) Data Collection Quality Assurance Plan
(b) Data Management Plan
(c) Health and Safety Plan
(d) Community Relations Plan

(3) Facility Investigation

(a) Environmental Setting
(b) Source Characterization
(c) Contaminations Characterization
(d) Potential Receptor Identification

(4) Investigation Analysis

(a) Data Analysis
(b) Protection Standards

(5) Identification and Development of the Corrective Measure Alternative or Alternatives

(a) Description of Current Situation
(b) Establishment of Corrective Action Objectives
(c) Laboratory and Bench-Scale Study
(d) Screening of Corrective Measures Technologies
(e) Identification of the Corrective Measures Alternative or Alternatives

(6) Evaluation of the Corrective Measure Alternative(s)

(a) Technical/Environmental/Human/Health Institutional
(b) Cost Estimate

(7) Justification and Recommendation of the Corrective Measure or Measures

(a) Technical
(b) Human Health
(c) Environmental

(8) Reports

(a) Preliminary and Workplan
(b) Progress
(c) Draft and Final

e. Upon ADPC&E review and approval of the FIWP, such approved FIWP will become part of this Consent Administrative Order and shall be implemented by the Respondent in the manner and in accordance with the schedule contained in the FIWP.

f. Upon ADPC&E approval of all work to be completed under the Scope of Work and approval of the final

corrective measures report submitted by Respondent hereunder, ADPC&E will select a corrective measure alternative(s) following public notice and opportunity for comment.

g. Respondent shall begin implementation of the corrective measure(s) selected pursuant to paragraph f (above) within sixty (60) days of notice from ADPC&E of the selected corrective measure(s).

h. ADPC&E and the Respondent recognize that circumstances may arise for which there are no provisions in the facility investigation work plan. Such circumstances may make necessary deviation from the approved plans. ADPC&E and the Respondent agree to negotiate in such instances to resolve any matters that may arise.

i. ADPC&E shall use its best effort to review all submittals made by the Respondent within thirty (30) days of receipt and shall notify the Respondent by the 30th day of its approval or disapproval of the submittal or its need for additional review time. In the event of disapproval of any submittal, ADPC&E shall at the same time specify in writing the reasonable basis for such disapproval and, if additional investigation or other work is required, a reasonable time schedule for completion. Subject to the dispute resolution provisions hereof, the Respondent shall undertake such additional activities or otherwise respond as required by this paragraph and, if appropriate, shall submit a revised report within any reasonable time specified by ADPC&E.

j. ADPC&E and the Respondent hereby designate respective project coordinators who shall be responsible for overseeing the implementation of the Consent Administrative Order. The parties' respective project coordinators shall communicate on all technical issues which arise under this Consent Administrative Order and shall be empowered, by agreement, to authorize minor field modifications in the Removal Plan referred to herein and to agree on minor modifications in the implementation of any of the tasks described in the Scope of Work attached hereto when such modifications are deemed by the parties to further the purposes of this

Consent Administrative Order. The parties' respective project coordinators may be changed by either party upon notice to the other party in writing.

The initial project coordinators shall be:

For ADPC&E:

Enforcement Branch Manager
Hazardous Waste Division
ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
8001 National Drive
Little Rock, Arkansdas 72219

For Respondent:

Mr. John Wagner
Environmental Engineer
Cedar Chemical Corporation
West Helena Plant
Highway 242
West Helena, Arkansas 72390

The parties' respective coordinators shall have the authority by written agreement, to make or authorize minor filed modifications in the Facility Investigation Work Plan or in technicques, procedures or designs used to carry out the Facility Investigation Work Plan which are necessary to the completion of this project.

k. All correspondence, reports, plans and other writings required under the terms of this Consent Administrative Order to ADPC&E shall be sent to the following:

Enforcement Branch Manager
Hazardous Waste Division
ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
8001 National Drive
Little Rock, Arkansas 72219

cc: Ms. Pat Crossley
ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
8001 National Drive
Little Rock, Arkansas 72219

All correspondence, reports, work plans and other writings required under the terms of this Consent Administrative Order to Respondent shall be sent to the following:

Mr. John Wagner
Environmental Engineer
Cedar Chemical Corporation
West Helena Plant
Highway 242
West Helena, Arkansas 72390

cc: Allen T. Malone
Apperson, Crump, Duzane & Maxwell
2110 One Commerce Square
Memphis, Tennessee 38103

1. Either party may designate additional representatives for purposes of receiving such notices.

TRADE SECRETS

11. The terms and provisions of this Consent Administrative Order shall not be interpreted or construed as a waiver of any rights which Respondent may have to restrict access to trade secrets for which a valid claim has been submitted and approved under the provisions of Section 6 of the Arkansas Hazardous Waste Management Code.

ACCESS TO THE SITE

12. During the term of this Consent Administative Order, ADPC&E and its employees, contractors and duly authorized representatives shall be granted access to the Site at reasonable times. Nothing in this Consent Administrative Order shall be construed as restricting the inspection or access authority of ADPC&E under applicable state law.

APPLICABLE LAW

13. All actions required to be taken pursuant to this Consent Administrative Order shall be undertaken in accordance with the requirements of all applicable, relevant and appropriate local, state and federal laws and regulations.

RECORD PRESERVATION

14. The Respondent shall preserve during the term of this Consent Administrative Order and for a minimum of seven (7)

years thereafter all records and documents in its possession or in the possession of its divisions, employees, agents, accountants or contractors which relate in any way to the Site or work performed pursuant to this Consent Administrative Order, notwithstanding any document retention policy to the contrary.

RESOLUTION OF DISPUTES

15. As to any submittal plan, report or schedule required hereunder, for which ADPC&E has provided the Respondent a notice of disapproval, Respondent shall either, within such reasonable time period as is provided by ADPC&E for response to such notice of disapproval, modify and resubmit to ADPC&E such submittal, or alternatively, Respondent shall notify ADPC&E of its disagreement with such disapproval whereupon the parties shall use their best efforts to resolve all disputes or differences of opinion informally and in good faith. If such disagreement cannot be resolved informally, the Respondent shall be entitled to invoke dispute resolution provisions contained hereinbelow.

16. If the Respondent disagrees in whole or in part with any decision or directive of ADPC&E, the Respondent shall promptly notify ADPC&E in writing of its objections and each ground therefor. Such notice shall set forth the specific points in dispute; the position that the Respondent asserts should be adopted as consistent with the requirements of this Consent Adminstrative Order; the grounds for the Respondent's position; and any other facts which it desires ADPC&E to consider.

17. The parties shall have a period of thirty (30) calendar days after ADPC&E's written receipt of the Respondent's written objections to attempt to resolve the dispute. If agreement is reached, the resolution shall be reduced to writing, signed by the representatives of each settling party and incorporated herein by reference.

18. If the parties are unable to reach an agreement within thirty (30) calendar days after ADPC&E's receipt of Respondent's written objections, ADPC&E, acting through its project coordinator, shall provide to Respondent within thirty (30) calendar days its written decision on the dispute. ADPC&E's project coordinator's decision shall control unless Respondent files a petition for resolution of the dispute with the Director of ADPC&E within fifteen (15) days of receipt of the ADPC&E project coordinator's decision. If such a petition is filed, the dispute shall be resolved by a proceeding before an Administrative Law Judge in accordance with the applicable Arkansas law.

SUBSEQUENT MODIFICATION OR AMENDMENT

19. This Consent Administrative Order may be amended or modified in any respect, including the addition of one or more additional respondents, by mutual agreement of ADPC&E and the Respondent. Such amendments or modifications shall be in writing and shall have as their effective date the date on which such amendments or modifications are assigned by ADPC&E and the Respondent.

RESERVATION OF RIGHTS

20. Nothing in this Consent Administrative Order shall constitute or be construed as a release by ADPC&E or Respondent of any claim, cause of action or demand in law or equity against any party not a signatory to this document for any liability relating to the Site arising out of the generation, storage, treatment, handling, transportation, release or disposal of any hazardous substances, pollutants or contaminants.

DELAY IN PERFORMANCE

21. If any event occurs which causes delay in the performance of the tasks required by this Consent Administrative Order, the Respondent shall have the burden of demonstrating that the delay was caused by circumstances beyond its control. The Respondent shall promptly notify ADPC&E orally and within seven (7) calendar days following oral notification to ADPC&E, notify ADPC&E in writing of any event or circumstance which it reasonably believes will delay its performance hereunder, including the anticipated length and cause of the delay, the measures taken and/or to be taken to prevent or minimize the delay and the time table by which the Respondent intends to implement such measures. Any delay in performance occasioned by such events or circumstances beyond Respondent's reasonable control shall extend deadlines hereunder which are affected thereby for so long as such event or circumstance continues to prevent the Respondent's performance.

CONTRIBUTION PROTECTION

22. The parties represent and agree that this Consent Administrative Order was negotiated in good faith. The Respondent, solely for the purpose of complying with this Consent Adminstrative Order, as it may be amended by mutual agreement, intends to assume responsibility for work exceeding the Respondent's equitable share. To that extent, the Respondent intends to seek contribution from responsible parties not entering into this Consent Administrative Order pursuant to ARATFA §8-7-520 or other applicable law. The parties agree that such right of contribution is an important aspect of this Consent Administrative Order.

COVENANT NOT TO SUE

23. Except as otherwise reserved herein, upon termination of this Consent Administrative Order, the ADPC&E covenants not to bring any civil, judicial or administrative action under any federal or state statute or the common law against the Respondent for any claim or cause of action arising from or related to the activities which are the subject of this Order, or for response costs incurred by ADPC&E which are within the scope of matters covered by this Order, or for natural resource damages.

EFFECTIVE DATE

24. This Consent Administrative Order shall become effective upon Respondent's receipt of a fully executed copy thereof.

IT IS SO AGREED AND ORDERED.

DATE: July 8, 1991

CEDAR CHEMICAL CORPORATION

By: Elgene Peane Jr., Plant Manager
RESPONDENT

DATE: 7/11/91

Randall Mathis
DIRECTOR, ARKANSAS DEPARTMENT OF POLLUTION CONTROL & ECOLOGY

EXHIBIT A

SCOPE OF WORK FOR A FACILITY INVESTIGATION (FI)
AT
CEDAR CHEMICAL CORPORATION ARD990660649

PURPOSE

The purpose of this Facility Investigation is to determine the nature and extent of releases of hazardous waste or constituents from regulated units, solid waste management units, and to gather all necessary data to support the Corrective Measures Study. The Respondent shall furnish all personnel, materials, and services necessary for, or incidental to, performing the remedial investigation at the site.

SCOPE

The Facility Investigation consists of five tasks:

Task I: Description of Current Conditions

- A. Facility Background
- B. Nature and Extent of Contamination

Task II: FI Workplan Requirements

- A. Data Collection Quality Assurance Plan
- B. Data Management Plan
- C. Health and Safety Plan
- D. Community Relations Plan

Task III: Facility Investigation

- A. Environmental Setting
- B. Source Characterization
- C. Contaminations Characterization
- D. Potential Receptor Identification

Task IV: Investigation Analysis

- A. Data Analysis
- B. Protection Standards

Task V: Reports

- A. Preliminary and Workplan
- B. Progress
- C. Draft and Final

Task I: DESCRIPTION OF CURRENT CONDITIONS

The Respondent shall submit to the ADPC&E for approval, a report providing the background information pertinent to the facility, contamination and any type of on-going corrective action as set forth below. Information from existing reports and studies is acceptable for any requirement in this Order as long as the source of this information is documented and it is pertinent and reflective of current conditions, and meets the format for the FI investigations.

A. Facility Background

The Respondent's report shall summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility for the treatment, storage or disposal of solid and hazardous waste. The Respondent's report shall include:

1. Separate maps depicting the following:

   a. General geographic location;

   b. Property lines, with the owners of all adjacent property clearly indicated;

   c. Surface drainage (with a contour interval of five (5) feet and a scale of 1 inch = 100 feet), depicting all wetlands, floodplains, water features, natural drainage patterns and respective drainage areas, manmade drainage pathways (berms, drains, etc.), NPDES outfalls, etc., and a description of all types of containment (natural and manmade).

   d. All tanks, buildings, utilities, pave areas, easements, right-of-way, and other features;

   e. All solid or hazardous waste treatment, storage or disposal areas active after November 19, 1980;

   f. All known past solid or hazardous waste treatment, storage or disposal areas (e.g., tanks, impoundments, landfill, etc.) regardless of whether they were active on November 19, 1980;

   g. All known past and present product and waste underground tanks or piping;

   h. Surrounding land uses (residential, commercial, agricultural, recreational); and

   i. Surrounding water uses (recreational, agricultural, industrial, etc.)

   j. The location of all production wells, groundwater monitoring wells, and piezometers. These wells shall be clearly labeled and ground and top of casing elevations, construction details, and techniques included (these elevations and details may be included as an attachment).

   k. Location, date and type of material spilled at the facility site which will reflect the information submitted for number 3 below.

   All maps shall be consistent with the requirements set forth in 40 CFR 270.14 and be of sufficient detail and accuracy to locate and report all current and future work performed at the site;

2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the facility;

3. Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted (local, state, or federal response units or private parties), including any inspection reports or technical reports generated as a result of the response; and

4. A summary of past environmental permits requested and/or received, any enforcement actions and their subsequent response, including a list of documents and studies submitted.

5. The Respondent shall submit a compilation of all historical groundwater and surface discharge analytical data for the purposes of review by ADPC&E. The Respondent shall submit the required summary within ninety (90) calendar days after the effective date of the order.

6. The Respondent shall document and report on all interim measures which were or are being undertaken at the facility other than those specified in the order. This shall include:

   a. Objectives of the interim measures: How the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long term solution at the facility;

   b. Design, construction, operation, and maintenance requirements;

   c. Schedules for design, construction and monitoring; and

   d. Schedules for progress reports.

7. The Respondent must provide a reference of all environmental permits, applied for and/or received, the purpose of the permit, and a short summary of the requirements.

8. The Respondent shall submit analytical results for all Appendix IX constituents and water wells for all existing groundwater monitoring wells..

B. Nature and Extent of Contamination

The Respondent's report shall include a description of the existing information on the nature and extent of contamination. The Respondent's report will include a description of the existing information.

1. The Respondent's report shall summarize all possible source areas of contamination. This, at a minimum, should include all regulated units, solid waste management units, spill areas, and other suspected source areas of contamination. For each area, the Respondent shall identify the following.

   a. Location of unit/area (which shall be depicted on a facility map);

   b. Quantities of solid and hazardous wastes;

   c. Hazardous waste or constituents, to the extent known; and

   d. Identification of areas where additional information is necessary.

2. The Respondent shall prepare a preliminary assessment and description of the existing degree and extent of contamination. This should include:

   a. Available monitoring data and qualitative information on locations and levels of contamination at the facility;

   b. All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality; and

c. The potential impact(s) on human health and the environment, including demography, groundwater and surface-water use, and land use.

TASK II: FIWP REQUIREMENTS

The Respondent shall prepare a Facility Investigation Workplan (FIWP). This FI Workplan shall include the development of several plans, which shall be prepared concurrently. During the Facility Investigation, it may be necessary to revise the FIWP to increase or decrease the detail of information collected to accommodate the facility specific situation. The FIWP shall include the following:

A. Data Collection Quality Assurance Plan

The Respondent shall prepare a plan to document all monitoring procedures: sampling, field measurements and sample analysis performed at the facility during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented.

1. Data Collection Strategy

The strategy section of the Data Collection Quality Assurance Plan shall include but not be limited to the following:

a. Description of the intended uses for the data, and the necessary level of prevision and accuracy for these intended uses:

b. Description of methods and procedures to be used to assess the revision, accuracy and completeness of the measurement data;

2. Sampling and Field Measurements

The Sampling Field Measurements Section of the Data Collection Quality Assurance Plan shall at least discuss:

a. Selecting appropriate sampling and field measurements locations, depths, etc.;

b. Providing a statistically sufficient number of sampling and field measurement sites;

c. Determining conditions under which sampling or field measurements should be conducted;

d. Determining which parameters are to be measured and where;

e. Selecting the frequency of sampling and length of sampling period;

f. Selecting the types of sample (e.g., composites vs. grabs) and number of samples to be collected;

g. Measures to be taken to prevent contamination of sampling or field measurements equipment and cross contamination between sampling points;

h. Documenting field sampling operations and procedures;

i. Selecting appropriate sample containers;

j. Sample preservation; and

k. Chain-of-custody.

3. Sample Analysis

a. Chain-of-custody procedures;

b. Sample storage procedures and holding times;

c. Sample preparation methods;

d. Analytical procedures;

e. Calibration procedures and frequency;

f. Data reduction, validation and reporting; and

g. Internal quality control checks, laboratory performance and systems audits and frequency.

B. Data Management Plan

The Respondent shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation, such as:

1. Data Record

2. Tabular Displays

3. Graphical Displays

C. Health and Safety Plan

The Respondent shall prepare a facility Health and Safety Plan.

1. Major elements of the Health and Safety Plan shall include;

a. Facility description including availability of resources such as roads, water supply, electricity and telephone service;

b. Describe the known hazardous and evaluate the risks associated with the incident and with each activity conducted;

c. List key personnel and alternates responsible for site safety, responses operations, and for protection of public health;

d. Delineate work area;

e. Describe levels of protection to be worn by personnel in work area;

f. Establish procedures to control site access;

g. Describe decontamination procedures for personnel and equipment;

h. Establish procedures to control site access;

i. Describe decontamination procedures for personnel and equipment;

j. Establish site emergency procedures;

k. Address emergency medical care for injuries and toxicological problems;

l. Describe requirements for an environmental surveillance program;

m. Specify any routine and special training required for responders; and

n. Establish procedures for protecting worker from weather-related problems.

2. The Facility Health and Safety Plan shall be consistent with:

a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

b. EPA Order 1440.1 - Respiratory Protection;

c. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;

d. Approved Facility Contingency Plan;

e. EPA Standard Operating Safety Guide (1984);

f. OSHA regulations particularly in 29 CFR 1910 and 1926;

g. State and local regulations; and

h. Other EPA guidance as provided.

D. Community Relations Plan

The Respondent shall prepare a plan, for the dissemination of information to the public regarding investigation activities and results.

E. Project Management Plan

The Respondent shall prepare a Project Management Plan which will include a discussion of the technical approach, schedules, budget, and key project personnel. The Project Management Plan will also include a description of qualifications of key project personnel performing or directing the FI, including contractor personnel. This plan shall also document management approach to the Facility Investigation.

TASK III: FACILITY INVESTIGATION

The Respondent shall conduct those investigations of SWMUs previously identified with known or suspected releases of contamination as necessary to protect human health and the environment to: characterize the facility (Environmental Setting); define the source (Source Characterization); and identify actual or potential receptors.

Investigations should result in data of adequate technical quality to support the development and evaluation of the corrective measure alternative or alternatives during the Corrective Measures Study, when necessary.

Data and reports submitted to ADPC&E under the Previous Consent Administrative Order referred to in Paragraph 7 of the Order shall be accepted for any requirement in this Order in addition to such additional data deemed necessary to supplement the data previously furnished.

The facility investigation activities shall when conducted follow the plans set forth in Task II. All sampling and analyses shall be conducted in accordance with the Data Collection Quality Assurance Plan. All sampling locations shall be documented in a log and identified on a detailed site map. Information from existing reports and studies is acceptable for any requirement in the order as long as the source of this information is documented and it is pertinent and reflective of current conditions, and meets the format for the RFI investigations.

A. Environmental Setting

The Respondent shall collect information to supplement and verify existing information on the environmental setting at the facility. The Respondent shall characterize the following:

1. Hydrogeology

The Respondent shall conduct a program to evaluate hydrogeologic conditions at the facility. This program shall provide the following information:

a. A description of the regional and facility specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the facility;

b. An analysis of any topographic features that might influence the groundwater flow system. (Note; Stereographic analysis of aerial photographs may aid in this analysis).

c. Based on field data, tests, (gamma and neutron logging of existing and new wells, piezometers and borings) and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated units).

d. Based on field studies and cores, structural geology and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways identifying:

i. Unconsolidated sand and gravel deposits

ii. Zones of fracturing or channeling in consolidated or unconsolidated deposits;

iii. Zones of higher permeability or lower permeability that might direct and restrict the flow of contaminants;

e. Based on data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant sources, a representative description of water level or fluid pressure monitoring.

f. A description of manmade influences that may affect the hydrogeology of the site.

2. Soils

The Respondent shall conduct a program to characterize the soils and rock units above the water table in the vicinity of the contaminant release(s). Such characterization shall include, but not be limited to, the following information:

a. Surface soil distribution;

b. Soil profile, including ASTM classification of soils;

c. Transects of soil stratigraphy;

d. Saturated hydraulic conductivity;

e. Porosity;

f. Cation exchange capacity (CEC);

g. Soil organic content;

h. Soil pH;

i. Particle size distribution;

j. Depth of water table;

k. Moisture content;

l. Effect of stratification on unsaturated flow;

m. Infiltration;

n. Evapotranspiration;

o. Residual concentration of contaminants in soil; and

p. Mineral and metal content.

B. Source Characterization

The Respondent shall collect analytical data to completely characterize the wastes and the areas where wastes have been placed, including: type; quantity; physical form; disposition (containment or nature of deposits); and facility characteristics affecting release (e.g., facility security, and engineered barriers). This shall include quantification of the following specific characteristics, at each source area:

1. Unit/Disposal Area characteristics:

a. Location of unit/disposal area;

b. Type of unit/disposal area;

c. Design features;

d. Operating practices (past and present);

e. Period of operation;

f. Age of unit/disposal area;

g. General physical conditions; and

h. Method used to close the unit/disposal area.

2. Waste Characteristics:

a. Type of waste placed in the unit;

b. Physical and chemical characteristics;

c. Migration and dispersal characteristics of the waste;

The Respondent shall document the procedures used in making above determinations.

C. Contamination Characteristics

The Respondent shall collect analytical data on groundwater, soils, surface water, sediment, and subsurface gas contamination when necessary to characterize contamination from a SWMU. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include time and location of sampling, media sampled, concentrations found, conditions during sampling, and the identify of the individual(s) performing the sampling and analysis. The Respondent shall address the following types of contamination at the facility:

1. Groundwater Contamination

The Respondent shall conduct a Groundwater Investigation to characterize any plumes of contamination at the facility. This investigation shall at a minimum provide the following information:

a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility;

b. The horizontal and vertical direction of contamination movement;

c. The velocity of contaminant movement;

d. The horizontal and vertical concentration profiles of any Appendix IX constituents in the plume(s);

e. An evaluation of factors influencing the plume movement; and

f. An extrapolation of future contaminant movement.

The Respondent shall document the procedures used in making the above determinations (e.g., well design, well construction, geophysics, modeling, etc.).

2. Soil Contamination

The Respondent shall conduct an investigation to characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include the following information:

a. A description of the vertical and horizontal extent of contamination;

b. A description of contaminant and soil chemical properties within the contaminant source area and plume migration and transformation;

c. Specific contaminant concentrations;

d. The velocity and direction of contaminant movement; and

e. An extrapolation of future contaminant movement.

The Respondent shall document the procedures used in making the above determinations.

3. Surface Water Contamination

The Respondent shall conduct a surface water investigation to characterize contamination in surface water bodies resulting from contaminant releases at the facility. The investigation shall include the following:

a. A description of the horizontal and vertical extent of any immiscible or dissolved plumes originating from the facility, and the extent of contamination in the underlying sediments;

b. The horizontal and vertical direction and velocity of contaminant movement;

c. An evaluation of the physical, biological, and chemical factors influencing contaminant movement;

d. An extrapolation of future contaminant movement; and

e. A description of the chemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

The Respondent shall document the procedures used in making the above determinations.

4. Air Contamination

The Respondent shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. This investigation shall provide the following information:

a. A description of the horizontal and vertical direction and velocity of contaminant movement;

b. The rate and amount of the release; and

c. The chemical and physical composition of the contaminant(s) released, including horizontal and vertical concentration profiles.

5. Subsurface Gas

The Respondent shall provide information characterizing the nature, rate and extent of releases of reactive gases from the units. Such information shall include, but not be limited to: provisions for

monitoring subsurface gases released from the unit; and an assessment of the potential for these releases to have a threat to human health and environment.

The Respondent shall document the procedures used in making the above determination.

D. Potential Receptors

The Respondent shall collect data describing the human populations and environmental systems that are susceptible to contaminant exposure from the facility. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems (e.g., stressed vegetation) may also be obtained. The following characteristics shall be identified:

1. Local uses and possible future uses of ground water:

   a. Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial); and

   b. Location of all ground water wells, names of current owners or tenants at those locations, and the current use of these wells within a one mile radius of the facility.

2. Local uses and possible future uses of surface waters within a 1.5-mile radius of the facility:

   a. Domestic and municipal (e.g., potable and lawn/gardening watering);

   b. Recreational (e.g., swimming, fishing);

   c. Agricultural;

   d. Industrial; and

   e. Environmental (e.g., fish and wildlife propagation).

3. Human use of or access to the facility and adjacent lands, including but not limited to:

   a. Recreation;

   b. Hunting;

   c. Residential;

   d. Commercial;

   e. Zoning; and

   f. Relationship between population locations and prevailing wind direction.

4. A description of the biota in surface water bodies on, adjacent to, or affected by the facility.

5. A description of the ecology overlying and adjacent to the facility.

6. A demographic profile of the people who use or have access to the facility and adjacent land, including, but not limited to: age, sex; and sensitive subgroups.

7. A description of any endangered or threatened species near the facility.

TASK IV: INVESTIGATIVE ANALYSIS

The Respondent shall prepare an analysis and summary of all facility investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support the Corrective Measures Study, if one is required.

The Respondent shall analyze all facility investigation data outlined in Task II and prepare a report on the type and extent of contamination at the facility including sources and migration pathways. The report shall describe the contamination (qualitative/quantitative) in relation to the background levels indicative for the area.

For solid waste management units the Respondent shall provide information to support the ADPC&E selection/development of Ground Water Protection Standards for all of the Appendix IX constituents found in the ground water during the Facility Investigation (Task III), or other investigations required by the order.
The Respondent shall identify all relevant and applicable standards for the protection of human health and the environment (e.g., National Ambient Air Quality Standards, Federally-approved State water quality standards, ground water protection standards, etc.).

The Respondent shall identify any corrective measure which may be applicable to the site. This identification of preliminary corrective measure technologies shall be based on the analysis of all facility investigation data developed in Task II and other reports prepared pursuant to this Task IV.

TASK V: REPORTS

A. Preliminary and Workplan

The Respondent shall submit to ADPC&E the Preliminary Report (Task I) and the Facility Investigation Workplan (Task II) as described in the Order.

B. Progress

The Respondent shall at a minimum provide the ADPC&E with signed, quarterly progress reports containing:

1. A description and estimate of the percentage of the FI completed;

2. Summaries of all findings to date;

3. Summaries of all changes made in the FI during the reporting period;

4. Summaries of all contacts relating to environmental matters with representatives of the local community, public interest groups or State government during the reporting period;

5. Summaries of all problems or potential problems encountered during the reporting period;

6. Actions being taken to rectify problems;

7. Changes in personnel during the reporting period; and

8. Projected work for the next reporting period.

C. Draft and Final

The FI Report shall be developed in draft form for the ADPC&E's review. The FI Report shall be developed in final format incorporating comments received on the Drafted FI Report.

Three (3) copies of all reports, including the Task I report, Task II workplan and both the Draft and Final FI Reports (Task III-IV) shall be provided by the Respondent. One of the copies provided should be on a formatted computer disc.

Facility Submission Summary

A summary of the information reporting requirements contained in the Facility Investigation Scope of Work is presented below:

Facility Submission	Due Date*
Description of Current Situation (Task I)	90 days;
FI Workplan (Task II)	90 days;
Draft FI Report (Task III and IV)	60 days after completing FI;
Progress Reports on Task I through V and interim measures	Quarterly

* All due dates are calculated from the effective date of the Order unless otherwise specified.

SCOPE OF WORK FOR A CORRECTIVE MEASURES STUDY (CMS)
AT
CEDAR CHEMICAL CORPORATION ARD990660649

PURPOSE

The purpose of this Corrective Measure Study (CMS) is to develop and evaluate the corrective action alternative or alternatives and to recommend the corrective measures to be taken at the site. The Respondent will furnish the personnel, materials, and services necessary to prepare the CMS, except as otherwise specified.

If the Respondent believes that certain requirements of the scope of work are not applicable, the specific requirements shall be identified and a detailed rationale for inapplicability shall be provided.

SCOPE

The Corrective Measure Study consists of four tasks:

Task VI: Identification and Development of the Corrective Measure Alternative or Alternatives

- A. Description of Current Situation
- B. Establishment of Corrective Action Objectives
- C. Laboratory and Bench-Scale Study
- D. Screening of Corrective Measures Technologies
- E. Identification of the Corrective Measure Alternative or Alternatives

Task VII: Evaluation of the Corrective Measure Alternative(s)

- A. Technical/Environmental/Human Health/Institutional
- B. Cost Estimate

Task VIII: Justification and Recommendation of the Corrective Measure or Measures

- A. Technical
- B. Human Health
- C. Environmental

Task IX: Reports

- A. Progress
- B. Draft
- C. Final

TASK VI: IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE ACTION ALTERNATIVE OR ALTERNATIVES

Based on the results of the Facility Investigation (FI) and consideration of the identified Preliminary Corrective Measure Technologies (Task I) the Respondent shall identify, screen, and develop the alternative(s) for removal, containment, treatment and/or other remediation of the contamination based on the objectives established for the corrective action.

A. Description of Current Situation

The Respondent shall submit an update to the information describing the current situation at the facility and the known nature and extent of the contamination as documented by the FI report. The Respondent shall

provide an update to information presented in Task I of the FI to ADPC&E regarding previous response activities and any interim measures which have or are being implemented at the facility. The Respondent shall also make a facility-specific statement of the purpose for the response, based on the results of the FI. The statement of purpose should identify the actual or potential exposure pathways that should be addressed by corrective measures.

B. Establishment of Corrective Action Objectives

The Respondent, in conjunction with ADPC&E shall establish site specific objectives for the corrective action. These objectives shall be based on public health and environmental criteria, information gathered during the Facility Investigation, EPA guidance and the requirements of any applicable Federal or Arkansas statutes. At a minimum, all corrective actions concerning groundwater releases from solid waste management units must be consistent with, and as stringent as, those required under 40 CFR 264.100.

C. Laboratory and Bench-Scale Study

When a new technology is being proposed or similar waste streams have not routinely been treated or disposed using the technology the Respondent shall conduct laboratory and/or bench-scale studies to determine the applicability of a corrective measure technology or technologies to the facility conditions. The Respondent shall analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

The Respondent shall develop a testing plan identifying the type(s) and goal(s) of the study(ies), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of testing, the Respondent shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan.

The Respondent shall prepare a report summarizing the testing program and its results, both positive and negative.

D. Screening of Corrective Measure Technologies

The Respondent shall review the results of the FI and reassess the technologies which are applicable to the facility. The Respondent shall screen the preliminary corrective measure technologies identified in Task IV of the FI and any supplement technologies to eliminate those that may prove infeasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that do not achieve the corrective measure objective within a resonable time period. This screening process focuses on eliminating those technologies which have severe limitations for a given set of waste and site-specific conditions. The screening step may also eliminate technologies based on inherent technology limitations. Site, waste, and technology characteristics which are used to screen inapplicable technologies are described in more detail below:

1. Site Characteristics

Site data should be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics should be eliminated from further consideration;

2. Waste Characteristics

Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site); and

3. Technology Limitations

The level of technology development, performance record, and inherent construction, operation and maintenance problems shall be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

E. Identification of the Corrective Measure Alternatives

The Respondent shall develop the corrective measure alternatives based on the corrective measure objectives and analysis of Preliminary Corrective Measure Technologies, as presented in Task IV of the FI as supplemented following the preparation of the FI report. The Respondent shall rely on engineering practice to determine which of the previously identified technologies appear most suitable for the site. Technologies can be combined to form the overall corrective action alternatives. The alternatives developed should represent a workable number of options that each appear to adequately address all site problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. The Respondent shall document the reasons for excluding technologies, identified in Task IV, as supplemented in the development of the alternative.

TASK VII: EVALUATION OF THE CORRECTIVE MEASURE ALTERNATIVE OR ALTERNTIVES

The Respondent shall describe each corrective measure alternative that passed the Initial Screening in Task VII and evaluate each corrective measure alternative and it's components. The evaluation shall be based on technical, environmental, human health and institutional concerns. The Respondent shall also develop cost estimates for each corrective measure.

A. Technical/Environmental/Human Health/Institution

The Respondent shall provide a description of each corrective measure alternative which includes but is not limited to the following: preliminary process flow sheets; preliminary sizing and type of construction for buildings and structures; and rough quantities of utilities required. The Respondent shall evaluate each alternative in the four following areas:

1. Technical

The Respondent shall evaluate each corrective measure alternative based on performance, reliability, implementability and safety.

a. The Respondent shall evaluate performance based on the effectiveness and useful life of the corrective measure:

i. Effectiveness shall be evaluated in terms of the ability to perform intended functions such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure shall be determined either through design specifications or by performance evaluation. Any specific waste or site characteristics which could potentially impede effectiveness shall be considered. The evaluation should also consider the effectiveness of combinations of technologies; and

ii. Useful life is defined as the length of time the level of effectiveness can be maintained. Most corrective measure technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure shall be evaluated in terms of the projected service lives of its component technologies. Resource availability in the future life of the technology, as well as appropriateness of the technologies, must be considered in estimating the useful life of the project.

b. The Respondent shall provide information on the reliability of each corrective measure including their operation and maintenance requirements and their demonstrated reliability:

i. Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities should be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements shall also be considered; and

ii. Demonstrated and expected reliability is a way of measuring the risk and effect of failure. The Respondent should evaluate whether the technologies have been used effectively under analogous conditions; whether the combination of technologies have been used together effectively; whether failure of any one technology has an immediate impact on receptors; and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.

c. The Respondent shall describe the implementability of each corrective measure including the relative ease of installation (constructability) and the total time required to achieve a given level of response:

i. Constructability is determined by conditions both internal and external to the facility conditions and includes such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and location of the facility (i.e., remote location vs. a congested urban area). The Respondent shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment

availability, and the location of suitable off-site treatment or disposal facilities;

ii. Time has two components that shall be addressed: the time it takes to implement a corrective measure and the time it takes to actually see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.

d. The Respondent shall evaluate each corrective measure alternative with regard to safety. This evaluation shall include threats to the safety of nearby communities and environments as well as those to workers during implementation. Factors to consider include fire, explosion, and exposure to hazardous substances.

2. Environmental

The Respondent shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on facility conditions and pathways of contamination actually addressed by each alternative. The Environmental Assessment for each alternative will include, at a minimum, and evaluation of: the short- and long-term beneficial and adverse effects of the response alternative; any adverse effects on environmentally sensitive areas; and an analysis of measures to mitigate adverse impacts.

3. Human Health

The Respondent shall assess each alternative in terms of the extent which it mitigates short- and long-term potential exposure to any residual contamination and protects human health both during and after implementation of the corrective measure. The assessment will describe the levels and characterizations of contaminants on-site, potential exposure routes, and potentially affected populations. Each alternative will be evaluated to determine the level of exposure to contaminants and the reduction over time. For management of mitigation measures, the relative reduction of impact will be determined by comparing residual levels of each alternative with existing criteria, standards, or regulations acceptable to ADPC&E.

4. Institutional

The Respondent shall assess relevant institutional needs for each alternative. Specifically, the effects of Federal, State and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative.

B. Cost Estimate

The Respondent shall develop an estimate of the cost of each corrective measure alternative (and for each phase or segment of the alternative). The cost estimate shall include capital, and operation and maintenance costs.

1. Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs.

a. Direct capital costs include:

i. Construction costs: Cost of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measure alternative.

ii. Equipment costs: Costs of treatment, containment, disposal and/or service equipment necessary to implement the action; these materials remain until the corrective action is completed;

iii. Land and site development costs: Expenses associated with purchase of land and development of existing property; and

iv. Building and services costs: Costs of process and non-process buildings, utility connections, purchased services, and disposal costs.

b. Indirect capital costs include:

i. Engineering expenses: Costs of administration, design construction supervision, drafting, and testing of corrective measure alternatives;

ii. Legal fees and license or permit costs: Administrative and technical costs necessary to obtain licenses and permits for installation and operation;

iii. Start-up and shakedown costs: Costs incurred during corrective measure start-up; and

iv. Contingency allowances: Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate facility characterization.

2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. The Respondent shall consider the following operation and maintenance cost components:

a. Operating labor costs: Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operation;

b. Maintenance materials and labor costs: Costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;

c. Auxiliary materials and energy: Costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;

d. Purchased services: Sampling costs, laboratory fees, and professional fees for which the need can be predicted;

e. Disposal and treatment: Costs of transporting, treating, and disposing of waste materials, such as treatment plant residues generated during operation;

f. Administrative costs: Costs associated with administration of corrective measure operation and maintenance not included under other categories;

g. Insurance, taxes, and licensing costs: Costs of such items as liability and sudden accidental insurance; real estate taxes on purchased land or rights-of-way; licensing fees for certain technologies; and permit renewal and reporting costs;

h. Maintenance reserve and contingency funds: Annual payments into escrow funds to cover (1) costs of anticipated replacement or rebuilding of equipment and (2) any large unanticipated operation and maintenance costs; and

i. Other costs: Items that do not fit any of the above categories.

TASK VIII. JUSTIFICATION AND RECOMMENDATION OF THE CORRECTIVE MEASURE OR MEASURES

The Respondent shall justify and recommend a corrective measure alternative using technical, human health, and environmental criteria. This recommendation shall include summary tables which allow the alternative or alternatives to be understood easily. Trade offs among health risks, environmental effects, and other pertinent factors shall be highlighted. The ADPC&E will select the corrective measure alternative or alternatives to be implemented based on the results of Tasks VIII and IX. At a minimum, the following criteria will be used to justify the final corrective measure or measures.

A. Technical

1. Performance - corrective measure or measures which are most effective at performing their intended functions and maintaining the performance over extended periods of time will be given preference;

2. Reliability - corrective measure or measures which do not require frequency or complex operation and maintenance activities and have provided effective under waste and facility conditions similar to those anticipated will be given preference;

3. Implementability - corrective measure or measures which can be constructed and operated to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time will be preferred; and

4. Safety - corrective measure or measures which pose the least threat to the safety of nearby residents and environments as well as workers during implementation will be preferred.

B. Human Health

The corrective measure or measures must comply with existing U.S. EPA and/or ADPC&E criteria, standards, or regulations for the protection of human health. Corrective measures which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time are preferred.

C. Environmental

The corrective measure or measures posing the least adverse impact (or greatest improvement) on the environment over the shortest period of time will be favored.

TASK IX: REPORTS

The Respondent shall prepare a Corrective Measure Study Report presenting the results of Tasks VII through IX recommending a corrective measure alternatives. Three (3) copies of the draft and final reports shall be provided to the ADPC&E by the Respondent. One of the copies provided shall be on a formatted computer disc.

A. Progress

The Respondent shall at a minimum provide the ADPC&E with signed quarterly progress reports containing:

1. A description and estimate of the percentage of the CMS completed;

2. Summaries of all findings;

3. Summaries of all changes made in the CMS during the reporting period;

4. Summaries of all contacts with representatives of the local community, public interest groups or State government during the reporting period;

5. Actions being taken to rectify problems;

6. Changes in personnel during the reporting period;

7. Projected work for the next reporting period; and

8. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. Draft

The Report shall at a minimum include:

1. A summary of the corrective measure or measures and rationale

   a. Description of the corrective measure or measures and rationale for selection;

   b. Performance expectations;

   c. Preliminary design criteria and rationale;

   d. General operation and maintenance requirements;

   e. Long-term monitoring requirements

2. Design and Implementation Precautions:

   a. Special technical problems;

   b. Additional engineering data required;

   c. Permits and regulatory requirements;

   d. Access, easements, right-of-way;

   e. Health and safety requirements; and

   f. Community relations activities.

3. Costs Estimates and Schedules

   a. Capital cost estimate;

   b. Operation and maintenance costs estimate; and

   c. Project schedule (design, construction, operation).

C. Final

The Respondent shall finalize the Corrective Measure Study Report incorporating comments received from the ADPC&E on the Draft Corrective Measure Study Report.